Appended Form 1

Specifications for Major Program

Name of School (Program) 〔School of Engineering Cluster 1(Mechanical Systems, Transportation, Material and Energy)〕

Program name (Japanese)	材料加工プログラム
(English)	Program of Material Processing

1.Academic degree to be Acquired   :

2.Overview

  The Program of Material Processing in Cluster 1 helps students acquire basic knowledge as mechanical engineers through the learning of basic mechanical subjects, drafting and design, and machine shop training at the Phoenix Workshop. Also, this program offers such materials-related specialized subjects as machine materials and materials science; specialized subjects related to the deformation and destruction of materials, such as material strength and elastic-plastic engineering; and specialized subjects that deal with the technology of forming processes, such as forming processes and machine processes. The program provides students with highly specialized education in the design, development, and use of functional materials, and in the principles of production and processing.   Through such education, this program aims at nurturing engineers and researchers who, having a broader perspective on human-machine relations, energy, and environmental issues, are able to assume cutting-edge design and development roles in production engineering. In order for students to develop their perspectives in other related fields, while also gaining in-depth expertise, the program will be run not only by specialists from the closely-related Materials and Processing Program, but also by specialists from the other three programs in Cluster 1, as well as by highly-skilled technical personnel from the Phoenix Workshop.

          Students are assigned to this program in the second semester of the second year. Then, in the first semester of the fourth year, students are assigned to their respective research laboratories, choose their research topics, and write up their graduation theses. Around sixty percent of graduates from this program will advance to graduate school. Graduates are employed in the general machinery and automotive fields, as well as in electronics, information & communications, heavy industry, the chemical industry, and a broad range of other industries. Centering on manufacturers in the fields of heavy industry, transportation equipment, machinery, and materials, they work actively in the fields of R&D, design, production engineering, and engineering marketing.

The Program of Material Processing offers not only machine-related basic education, but also specialized education concerning the design and development of new functional materials and utilization technology, as well as the principles of production and processing, and their the application.

To ensure that students are able to achieve the goals of the program, the program develops and puts into practice a curriculum based on the following policy:

・In the first year, the students take Liberal Arts Education subjects such as Peace Science Courses, Basic Courses in University Education, common subjects, and Foundation Courses, as well as specialized basic subjects and specialized practical education, such as machine shop training.

・In the first semester of the second year, specialized basic subjects suc   Ⅰ and Fluid Dynamics Ⅰ become major subjects. In the second semester of the second year, the students are assigned to this program. As a result, specialized subjects in accordance with the program become major subjects to be taken.

・In the third year, specialized subjects tailored to the program continue to become major subjects to be taken.

・In the fourth year, the students are assigned to their respective research laboratories, choose their research topics, and write their graduation theses.

---

5. Program Timing/Acceptance Conditions

the Second semester of the second year

By the first semester of the second year, students must have acquired the Liberal Arts Education subjects and specialized basic subjects that are commonly specified in Cluster 1. Acceptance conditions for the program are not particularly specified.

6.Qualifications to be Acquired

   Type-1 High School Teaching License (Industry)

 (Students must acquire the required number of credits for the Type-1 High School Teaching License (Industry), in addition to the required number of credits for this program.)

---

7. Class subjects and course content

* For class subjects, see the Course List table on the attached sheet.

* For course content, see the syllabus for each academic year.

---

8. Academic Achievements

At the end of each semester, the evaluation criteria are applied to each academic achievement evaluation item so that the level of attainment is clearl

criteria calculated by adding the weighted values to the numerically-converted values of their academic achievement in each subject being evaluated (S = 4, A = 3, B = 2, and C= 1).

Evaluation of academic achievement	Converted values
S(Excellent: 90 points or higher)	4
A(Superior:80-89 points)	3
B(Good: 70-79 points)	2
C(Fair: 60-69 points)	1

Academic achievement	Evaluation criteria
Excellent	3.00～4.00
Very Good	2.00～2.99

* For the relationship between evaluation items and evaluation criteria, see the attached Sheet 2 .
* For the relationship between evaluation items and class subjects, see the attached Sheet 3.
* For the curriculum map, see the attached Sheet 4.

9. Graduation Thesis (Graduation Research) (Positioning, When and how it is assigned, etc.)

The graduation thesis is positioned as one of the major subjects to achieve the following learning/educational goals:

(E) Developing communication skills and the ability to globally collect and dispatch information.

When it is assigned: At the start of the fourth year (only to those who meet the conditions for embarking on a graduation thesis)
Conditions for embarking on a graduation thesis
(1) Students must gain 45 credits or more out of 48 credits, the required number for graduation in Liberal Arts Education subjects.
(2)Students must gain 10 credits or more in the first group of specialized basic subjects
(3) Students must gain all of the required credits in Machine Design and Drawing, CAD, Mechanical Engineering Design and Production, Machine Shop Training, Experiments in Mechanical Engineering Ⅰ, and Experiments in Mechanical Engineering Ⅱ.
(4) Students must gain 18 credits or more out of 22 credits, the required number in the second group of specialized basic subjects.
(5) Students must gain a total of 68 units or more in specialized basic subjects and specialized subjects.

  The research details of each laboratory to which the students can be assigned are explained by giving out handouts at a briefing held in February, in the second semester of the third year. After the number of students acceptable to each laboratory is given at the start of the fourth year, students who can begin their graduation theses are assigned as requested. In the case that the number of students exceeds the acceptable limit for a laboratory, adjustments may be made.

10. Responsibility-taking System
 (1) PDCA Responsibility-
The cluster leader and program leader are responsible for executing this program. Faculty committee members responsible for this program make plans, while self-check/evaluation committee members responsible for this program make evaluations. The cluster and program teachers committee scrutinize the plans and evaluations from time to time for further improvement. When major issues arise, a working group may be established at the discretion of cluster leader and program leader.
 (2) Program assessment

 ・Whether each class subject is properly allocated in light of the goals of the program, and whether course

questionnaires obtained from students, subject teachers draw up class improvement plans that reflect the questionnaire results.

Cluster 1（Mechanical Systems, Transportation, Material and Energy）

◎ Required subject (period of registration specified)
○ Compulsory elective subject (any of these subjects shall be registered)
△ Free elective subject (any of these subjects shall be registered)

Year in which the subject is taken(*The lower figure means semester) (Note 1)

Subject type	Required No. of credits	Class subjects, etc.	No. of credits	Type of course registration	G1 1T	G1 2T	G1 3T	G1 4T	G2 1T	G2 2T	G2 3T	G2 4T	G3 1T	G3 2T	G3 3T	G3 4T	G4 1T	G4 2T	G4 3T	G4 4T
	2		2	Required	○															
	2	Introduction to University Education	2	Compulsory elective	◎															
	2	Introductory Seminar for First-Year Students	2	Compulsory elective		◎														
	4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective	○		○													
	4	Courses in Natural Sciences	2	Compulsory elective		○		○												
Foreign Languages		Basic English UsageI	1		◎	◎														
		Basic English UsageII	1				◎	◎												
		CommunicationIA	1		◎	◎														
		Communication IB	1		◎	◎														
		Communication IIA	1						◎	◎										
		Communication IIB	1						◎	◎										
		Communication IIIA	1										○		○					
		Communication IIIB	1										○		○					
		Communication IIIC	1										○		○					
		Initial Foreign Languages (Select one language from German, French and Chinese)																		
	2	Elements of Information Literacy or Exercise in Information Literacy	2	Compulsory elective	○	○														
	2		1or2	Compulsory elective	○	○	○	○												
		CalculusI	2				◎													
		CalculusII	2					◎												
		Linear AlgebraI	2		◎															
		Linear AlgebraII	2				◎													
		Seminar in Basic Mathematics I	1			◎														
		Seminar in Basic Mathematics II	1					◎												
		General Mechanics I	2		◎															
		General Mechanics II	2				◎													
		Basic Electromagnetism	2							◎										
		Experimental Methods and Laboratory Work in Physics I (Note 4)	1				◎													
		Experimental Methods and Laboratory Work in Physics II (Note 4)	1					◎												
		General Chemistry	2							○										
		Experimental Methods and Laboratory Work in Chemistry I (Note 4)	1				○													
		Experimental Methods and Laboratory Work in Chemistry II (Note 4)	1					○												

48

◎

○

△

◎
○
△

◎
○
◎
◎
○
◎
◎
○
△
△
○
△
◎
△
△
△
○
△
○
◎
○

Curriculum Map of Materials Processing

Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Introduction to University Education(◎)	Area Courses(○)	Area Courses(○)	Area Courses(○)	Reliability Engineering(○)	Internship(○)		
Peace Science Courses(○)	Health and Sports Courses(○)						
Area Courses(○)							
Health and Sports Courses(○)							
Exercise in Information Literacy(○)	CalculusII(◎)	Basic Electromagnetism(◎)		Computer Programming(◎)			
Elements of Information Literacy(○)	Linear AlgebraII(◎)	General Chemistry(○)					
CalculusI(◎)	Seminar in Basic Mathematics II(◎)	Basic Engineering Computer Programming(◎)					
Linear AlgebraI(◎)	General Mechanics II(◎)						
Seminar in Basic Mathematics I(◎)	Experimental Methods and Laboratory Work in Physics I・II(◎)						
General Mechanics I(◎)	Experimental Methods and Laboratory Work in Chemistry I・II(○)						
	Applied Mathematics I(◎)	Applied Mathematics II(◎)	Applied Mathematics III(◎)	Engineering Mathematics A(○)	Synthesis of Applied Mathematics(○)		
	Practice of Mechanics(△)	Probability and Statistics(◎)	Engineering Mathematics C(○)	Mechanical Materials I(◎)	Mechanical Materials II(○)		
	Engineering Mechanics(△)	Mechanics of Material I(◎)	Dynamics of Vibrations I(◎)	Fusion and Solidification Processings I(◎)	Fracture Mechanics(◎)		
	Introduction of Mechanical and Transportation Engineering(◎)	Thermodynamics I(◎)	Materials Science(◎)	Machining(◎)	Plastic Working and Powder Metallurgy II(◎)		
	Machine Design and Drawing(◎)	Fluid Dynamics I(◎)	Elementary Electromagnetism(○)	Introduction to chemical physics(△)	Statistical and Thermal Physics(△)		
		Control Engineering I(◎)	Introduction to Quantum Physics(△)	Heat Transfer II(△)	Internal Combustion Engines(○)		
		An Introduction to Engineering Materials(◎)	Fluid Dynamics II(○)	Combustion Engineering Fundamentals(△)	Computational Solid Mechanics(○)		
		Fundamentals of Materials Processing(◎)	Thermodynamics II(△)	Plasma Engineering(◎)	Mechatronics(○)		
			Heat Transfer I(◎)	Theory of Elasticity and Plasticity(◎)	Optical Measurement Techniques(○)		